

CLAIMS

1. A catalyst substrate, comprising:
a substrate material comprising a catalyst;
a layer of an adsorption material disposed on said substrate material; and
5 a layer of an organometallic precursor disposed on said substrate material.
2. The catalyst substrate of Claim 1, wherein said adsorption material further comprises zeolites, inorganic oxides, and combinations comprising at least one of the foregoing adsorption materials.
3. The catalyst substrate of Claim 2, wherein said zeolites further comprise fjiusites, rare-earth exchanged zeolite, large pore zeolite, medium pore zeolite, ultra stable zeolite, de-aluminated zeolite, zeolite beta, zeolite powder, ZSM-3, ZSM-4, ZSM-5, ZSM-12, ZSM-18, ZSM-20, ZSM-
5 23, ZSM-35, ZSM-38, ZSM-48, MCM-22, and combinations comprising at least one of the foregoing zeolites.
4. The catalyst substrate of Claim 2, wherein said inorganic oxides further comprise alumina.
5. The catalyst substrate of Claim 1, wherein said organometallic precursor further comprises an organometallic precursor material and a catalyst material.
6. The catalyst substrate of Claim 5, wherein said organometallic precursor material further comprises naphthalenes, tallates, neodecanates, ispropoxides, carboxylic acids and their esters, carboxylates, alkoxycarboxylates, phthalates, alcohols, guanidine, fatty acids, and
5 combinations comprising at least one of the foregoing materials.

7. The catalyst substrate of Claim 5, wherein said carboxylic acid further comprises stearic acid, oleic acid, linolenic acid, hexanoic acid, octanoic acid, neodecanoic acid, and combinations comprising at least one of the foregoing acids.

8. The catalyst substrate of Claim 5, wherein said esters further comprise hexanoates, octanoates, neodecanoates, and combinations comprising at least one of the foregoing esters.

9. The catalyst substrate of Claim 5, wherein said catalyst material further comprises a noble metal, rare earth metal, alkaline earth metal, transition metal, and combinations comprising at least one of the foregoing materials.

10. The catalyst substrate of Claim 9, wherein said catalyst material further comprises silver, barium, and combinations comprising at least one of the foregoing metals.

11. The catalyst substrate of Claim 10, wherein said catalyst material has a particle size of less than about 50 nanometers.

12. The catalyst substrate of Claim 10, wherein said catalyst material has a particles size of less than about 25 nanometers.

13. The catalyst substrate of Claim 10, wherein said catalyst material has a particle size of less than about 15 nanometers.

14. The catalyst substrate of Claim 10, wherein said catalyst material has a particle size of less than about 10 nanometers.

15. The catalyst substrate of Claim 1, further comprising a layer of an organometallic precursor disposed on said adsorption material layer.

16. The catalyst substrate of Claim 1, further comprising a second layer of an organometallic precursor disposed on said first layer of said organometallic precursor.

17. The catalyst substrate of Claim 1, further comprising a layer of adsorption material and organometallic precursor material disposed on said substrate material.

18. A method for manufacturing a catalyst substrate, comprising:

forming a substrate;

applying a catalyst to said substrate;

applying a layer of an adsorption material to said substrate; and

applying a layer of an organometallic precursor to said substrate.

19. The method of Claim 18, wherein said applying further comprises washcoating, imbibing, impregnating, physisorbing, chemisorbing, precipitating, and combinations comprising at least one of the foregoing methods.

20. The method of Claim 18, further comprising applying a second layer of an organometallic precursor to said substrate.

21. The method of Claim 18, further comprising applying a layer of an adsorption material and organometallic precursor to said substrate.

22. The method of Claim 21, wherein said application further comprises mixing said adsorption material and organometallic precursor.

23. The method of Claim 18, wherein said applying said layer of said organometallic precursor further comprises applying an organometallic solution comprising a catalyst material and an organometallic precursor material to said substrate.

24. The method of Claim 18, wherein said application further comprises applying one or more adsorption materials selected from the group consisting of ftiusites, rare-earth exchanged zeolite, large pore zeolite, medium pore zeolite, ultra stable zeolite, de-aluminated zeolite, zeolite beta, zeolite powder, ZSM-3, ZSM-4, ZSM-5, ZSM-12, ZSM-18, ZSM-20, ZSM-23, ZSM-35, ZSM-38, ZSM-48, MCM-22, alumina, and combinations comprising at least one of the foregoing materials.

25. The method of Claim 18, wherein said application further comprises applying one or more organometallic precursors comprising an organometallic precursor material and a catalyst material, wherein said organometallic precursor material is selected from the group consisting of naphthalenes, tallates, neodecanates, isopropoxides, carboxylic acids and their esters, carboxylates, alkoxycarboxylates, phthalates, alcohols, guanidine, fatty acids, and combinations comprising at least one of the foregoing materials, wherein said catalyst material is selected from the group consisting of noble metals, rare earth metals, alkaline earth metals, transition metals, and combinations comprising at least one of the foregoing catalyst materials.

26. The method of Claim 25, wherein said carboxylic acid is selected from the group consisting of stearic acid, oleic acid, linolenic acid, hexanoic acid, octanoic acid, neodecanoic acid, and combinations comprising at least one of the foregoing acids.

27. The method of Claim 25, wherein said ester is selected from the group consisting of hexanoates, octanoates, neodecanoates, and combinations comprising at least one of the foregoing esters.

28. A catalytic converter, comprising:

a catalyst substrate comprising a catalyst, and an organometallic precursor disposed in an adsorption material;

5 a shell having at least one end, and concentrically disposed about said catalyst substrate; and

a mat support material disposed concentrically in between said catalyst substrate and said shell, and around said catalyst substrate.

29. The catalytic converter of Claim 28, wherein said adsorption material further comprises zeolites, inorganic oxides, and combinations comprising at least one of the foregoing adsorption materials.

30. The catalytic converter of Claim 29, wherein said zeolites further comprise fjiusites, rare-earth exchanged zeolite, large pore zeolite, medium pore zeolite, ultra stable zeolite, de-aluminated zeolite, zeolite beta, zeolite powder, ZSM-3, ZSM-4, ZSM-5, ZSM-12, ZSM-18, ZSM-20,
5 ZSM-23, ZSM-35, ZSM-38, ZSM-48, MCM-22, and combinations comprising at least one of the foregoing zeolites.

31. The catalytic converter of Claim 29, wherein said organometallic precursor further comprises an organometallic precursor material and a catalyst material, wherein said organometallic precursor further comprises naphthalenes, tallates, neodecanates, isopropoxides, carboxylic acids
 5 and their esters, carboxylates, alkoxycarboxylates, phthalates, alcohols, guanidine, fatty acids, and combinations comprising at least one of the foregoing materials, wherein said catalyst material further comprises noble metals, rare earth metals, alkaline earth metals, transition metals, and combinations comprising at least one of the foregoing catalyst materials.

32. The catalytic converter of Claim 31, wherein said carboxylic acid further comprises stearic acid, oleic acid, linolenic acid, hexanoic acid, octanoic acid, neodecanoic acid, and combinations comprising at least one of the foregoing acids.

33. The catalyst substrate of Claim 31, wherein said esters further comprise hexanoates, octanoates, neodecanoates, and combinations comprising at least one of the foregoing esters.

34. A method for treating exhaust gas, comprising:
 introducing exhaust gas to a catalytic converter assembly comprising a shell concentrically disposed about a mat support material which is concentrically disposed about a catalyst substrate comprising a catalyst, an
 5 adsorption material, and an organometallic precursor;
 passing the exhaust gas through said catalytic converter;
 catalytically treating one or more constituents in the exhaust gas.

35. The method of Claim 34, further comprising catalytically treating said one or more constituents in the exhaust gas using said organometallic precursor.

37. The method of Claim 36, further comprising regenerating said adsorption material.